



FIG. 9C-15

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```
RiOrPf:=Get_Ri_To_Talk_About(Source,Where);
While (RiOrPf<>'') do
Begin
    If Convert_Ri_To_Pf(RiOrPf) then
        Insert(RiOrPf,Source,Where);
    RiOrPf:=Get_RI_To_Talk_About(Source,Where);
end;
{convert abstract ris to pfs}
{-----}
PROCEDURE Lower_Case(Var Source: Str150);
Var I : integer;
Begin
    For I:=1 to Length(Source) do
        If (Source[i]>'@') and
            (Source[i]<'[') then Inc(Source[i],32);
end; {lower case}
{-----}
FUNCTION Determine_Table(Var S: String): Integer;
Var Temp,Err: integer;
    SubSt : String[10];
Begin
    Temp:=0;
    While (S[temp+1] in ['0'..'9']) and (temp<4) do Inc(Temp);
    SubSt:=Copy(S,1,Temp);
    Delete(S,1,Temp);
    If SubSt>'' then
        Begin
            Val(SubSt,Temp,Err);
            If Err<>0 then Temp:=0;
        end
    else Temp:=0;
    Determine_Table:=Temp;
end; {determine table}
{-----}
FUNCTION Valid_Token(Var S: String; Var Table: Integer): Boolean;
Var TempSt: String;
Begin
    Table:=-1;
    If S[2] in ['0'..'9'] then
        Begin
            Delete(S,1,1);
            Table:=Determine_Table(S),
        end;
    Valid_Token:=Table>-1;
end; {valid token}
{-----}
PROCEDURE Get_Syn1(Var S: String; Table: Integer);
Var St: String[100];
    Suffix : Boolean;
Begin
    Suffix:=False;
    Case Table of {tables 0..10}
        0 : St:=Tired_Terms(false,suffix);
        1 : St:=Signif_Terms(false,suffix);
        2 : St:=A_Bit_Terms(false,suffix);
        3 : St:=Becoming_Terms(false,suffix);
        4 : St:=Possibly_Terms(false,suffix);
        5 : St:=Very_Much_Terms(AnyTerm,false,suffix);
        6 : St:=At_The_Terms(false,suffix);
        7 : St:=Right_By_The_Terms(false,suffix);
        8 : St:=Near_The_Terms(false,suffix);
        9 : St:=Far_From_The_Terms(false,suffix);
        10 : St:=Very_Soon_Terms(false,suffix);
        11 : St:=Moving_Terms(false,suffix);
    end;
    S:=St+S;
end; {Get syn 1}
{-----}
PROCEDURE Get_Syn2(Var S: String; Table: Integer);
Var ST : String[100];
    Suffix : Boolean;
Begin
```

FIG. 9C-17

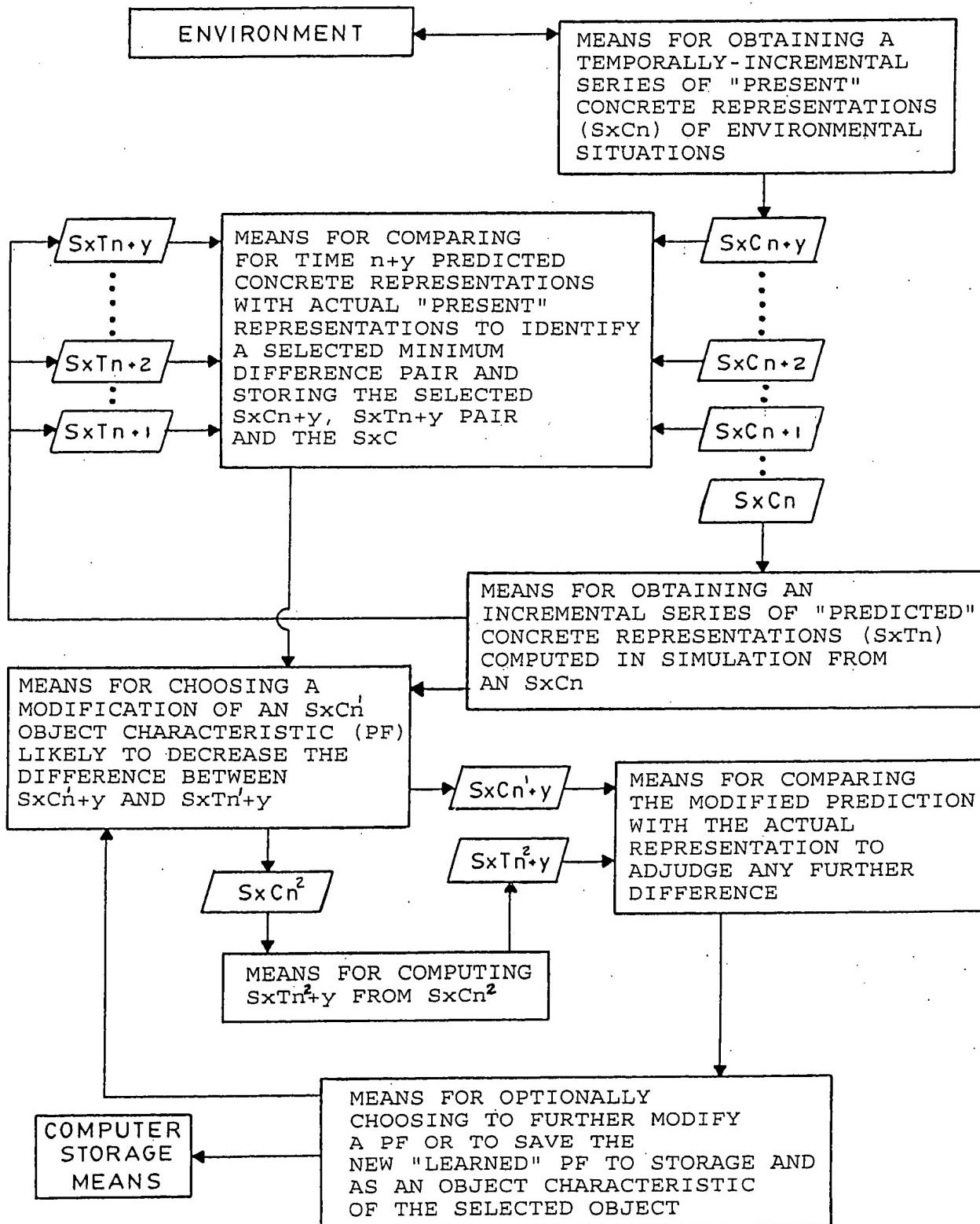
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```

end; {expand synonyms}
{-----}
PROCEDURE Convert_Ri_To_Rx(Var Source: String);
{ Purpose: Converts Ris in user identifier names to the actual Rxs that were used
in SiMod and decision making.
History: 03/27/91 : If RiNum=AnyRi, kick out first SE.Ri. }
Var RxName,
    RiName      : Str80;
    RiNum,
    RxCount,
    Where,I     : Integer;
    Pt          : PointPtr;
Begin
    RxName:='';
    RiNum:=0;
    RiName:=Get_Ri_To_Talk_About(Source,Where); {Strip ri from identifier}
    While RIName<>'' do
    Begin
        Pt:= RiList.Whose_Name(RiName,True,RiNum,i);
        If Pt<>Nil then
            Begin
                RxCount:=RiPtr(Pt)^.Get_Best_Rx_Match(Sxx^,RxName);
                If RxCount=1 then
                    Insert(RxName,Source,Where)
                else If (Convert_Ri_To_Pf(RIName)) then
                    Begin
                        Insert(RiName,Source,Where);
                        RxName:=RIName
                    end
                else Insert('<UNKNOWN>',Source,Where);
            end
        end
        else
            If (UpCase_String(RiName)='HIT') then
                Begin
                    RxName:=BrainRow^.SxRowRec.RelRow^.SxRowRec.Kind^.RxRec.Name;
                    Insert(RxName,Source,Where);
                end
            else
                Insert('<NOHIT>',Source,Where);
        RiName:=Get_Ri_To_Talk_About(Source,Where); {Strip ri from identifier}
    end;
    Expand_Synonyms(Source,255);
end; {Convert ri to rx}
{-----}
PROCEDURE Convert_Terms;
Var S : String[150];
    P : Pointer;
Begin
{DEBUG}
    Put_Text('Time: '+IntToStr(NowTime,1),10,10,15,True);
{DEBUG}
    Convert_Ri_To_Rx(ProblemName);
    If (AStoryRec.HitSINode<>Nil) then
        Begin
            SName:=AStoryRec.HitSINode^.Who_Am_I^;
            If SName<>'' then
                Convert_Ri_to_Rx(SName)
        end
    else SName:='';
    If AStoryRec.NextSINode<>Nil then
        Begin
            NextSName:=AStoryRec.NextSINode^.Who_Am_I^;
            If NextSName<>'' then
                Convert_Ri_To_Rx(NextSName)
        end
    else NextSName:='';
    If (AStoryRec.NowStratPtr<>Nil) then {Plan/Strategy names already set in
actions} Begin

```

FIG. 10A

REPRESENTATIVE FLOW CHART FOR COGNITIVE LEARNING

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FIG. 21

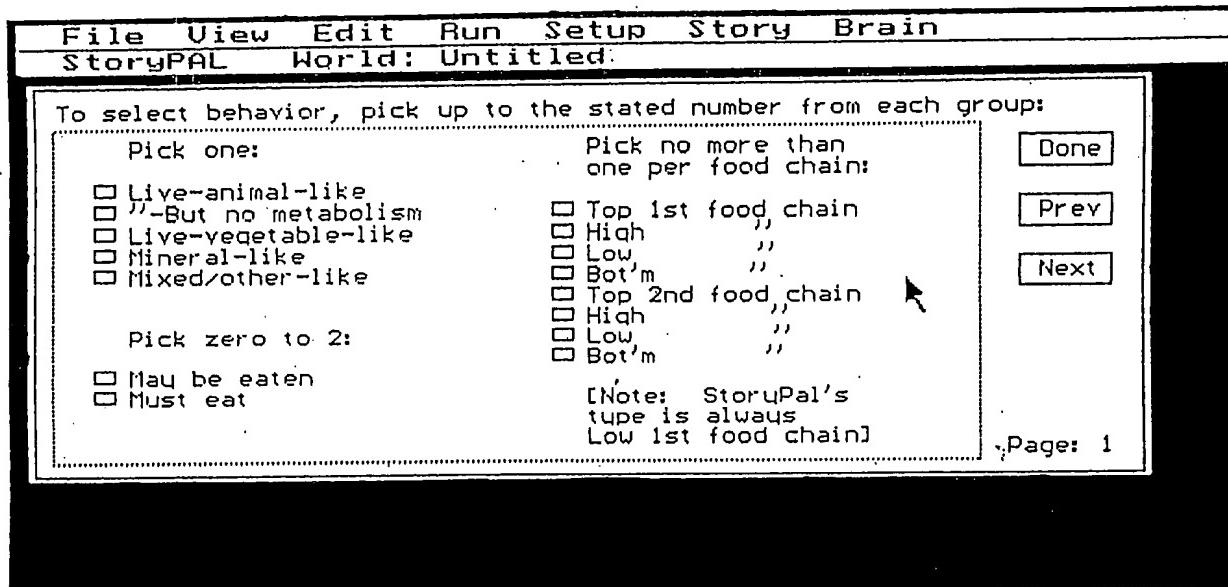
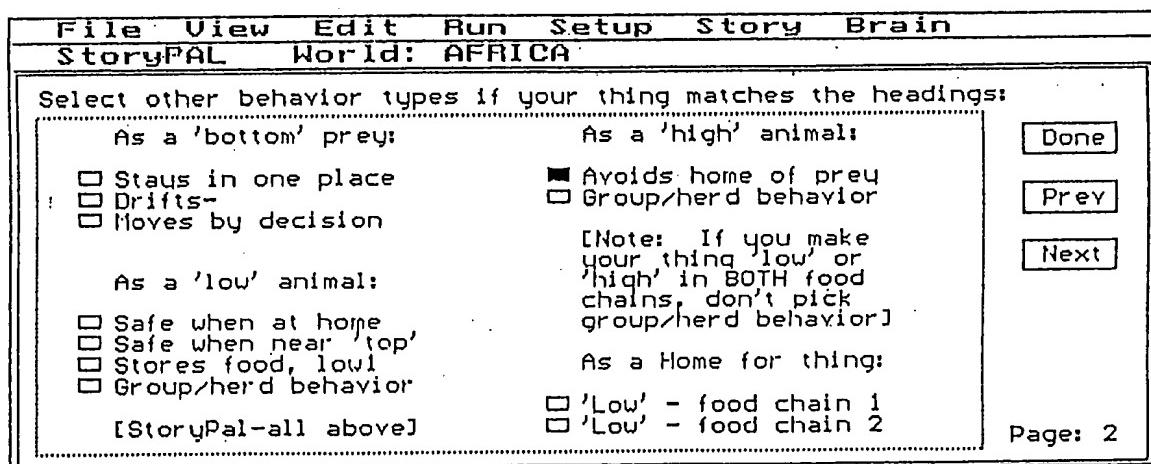


FIG. 22



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FIG. 23

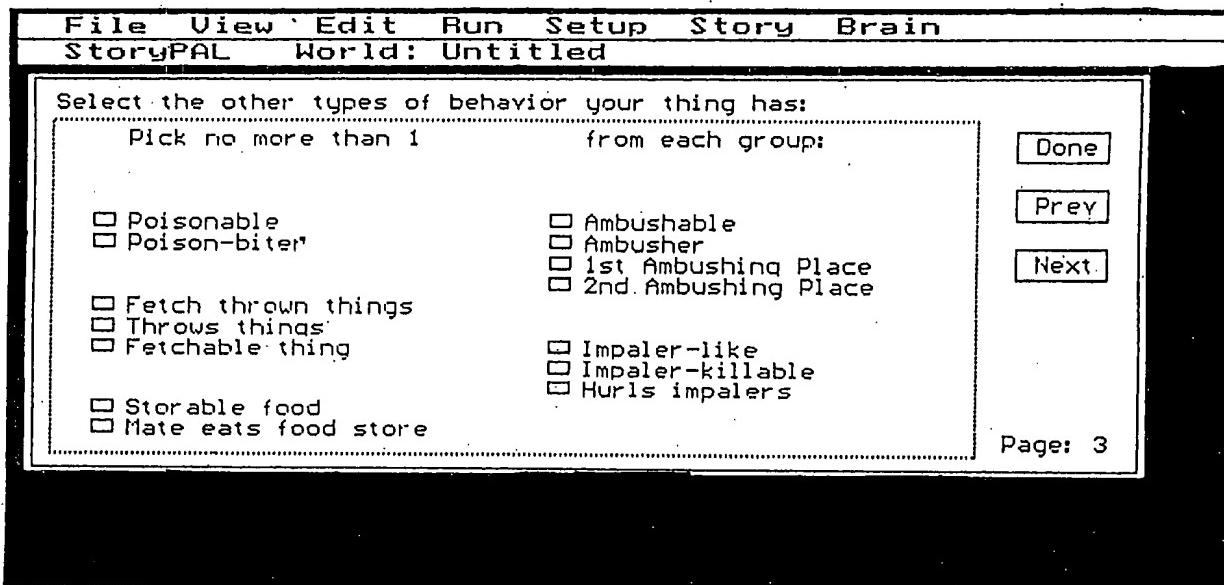


FIG. 24

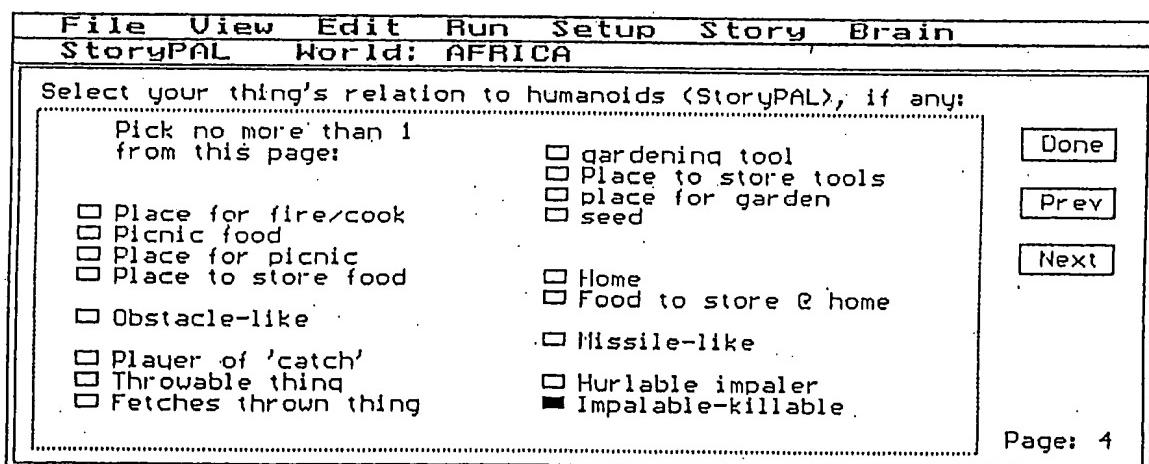


FIG. 30A-1

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[Get_Next_SX] - FantasyTime False
 [Deep Thought] - Ctime: 1
 Scanning strategy find something to do rfs:
 No rfs present.
 Scanning @14 rfs:
 No rfs present.

SxC(1):

RxName	X	Y	Decision	Speed	Rads	Reason	Situation
StoryPAL	232	214	NIL	0	1.67	MARV	NIL
lion	243	254	race to LowI	0	2.62	RF-SCAN	LowINear
tree	108	50	don't move	0	6.28	RF-SCAN	Anything
native	269	10	wander	0	1.58	RF-SCAN	Anything
rabbit	2	259	explore	0	4.43	RF-SCAN	Anything
rabbit	257	111	explore	0	5.99	RF-SCAN	Anything
deer	441	314	patrol	0	1.84	RF-SCAN	Anything
grass	29	326	don't move	0	5.26	RF-SCAN	Anything
grass	323	347	don't move	0	0.38	RF-SCAN	Anything
grass	335	86	don't move	0	5.83	RF-SCAN	Anything

[What_Now_Porpoise] : FantasyTime False
 Problem: @33 [H1]
 Row: 1
 Dsd: @27 [H1] 180 20 2H1
 Reg: TIRED
 Value: 10
 [Set_New_Problem]
 [Find_Strategy]
 [Find_Starting_Place_In_Strategy] - FantasyTime False
 SUB-P/SG NAME: seeing a struck [H1]
 SUB-P/SG NAME: safe @6 [HomeI]
 SUB-P/SG NAME: safe @6 [TopI]
 SUB-P/SG NAME: near [H1] & at [Imp]
 SUB-P/SG NAME: @8 [HomeI]
 SUB-P/SG NAME: @8 [TopI]
 HIT Strategy
 Strat.:@30 [H1]
 Plan:get @11 @12 [HomeI]
 Row:2
 SubGoal: @8 [HomeI]
 Row: 1

[Strat.Make_Decision]
 [Predicting_Strategy] Try: 1 of 25
 Trial DSD: @19 @12 [HomeI]
 [Get_Next_SX] - FantasyTime True

Ending SxT(1):

RxName	X	Y	Decision	Speed	Rads	Reason	Situation
StoryPAL	219	197	@19 @12 [HomeI]	21	2.22	MARV	NIL
lion	236	230	race to LowI	24	1.84	RF-SCAN	LowINear
tree	108	50	don't move	0	6.13	RF-SCAN	Anything
native	268	1	wander	10	4.70	RF-SCAN	Anything
rabbit	11	259	explore	10	6.21	RF-SCAN	Anything
rabbit	264	104	explore	10	0.67	RF-SCAN	Anything
deer	435	292	patrol	22	1.84	RF-SCAN	Anything
grass	29	326	don't move	0	0.67	RF-SCAN	Anything
grass	323	347	don't move	0	1.52	RF-SCAN	Anything
grass	335	86	don't move	0	0.00	RF-SCAN	Anything

[What_Now_Porpoise] : FantasyTime True
 [Next_N_Subgoals_Reached] - FantasyTime True
 SUB-P/SG NAME: safe @6 [HomeI]
 No next(n) subgoal found.

[Predicting_Strategy] Try: 2 of 25
 Trial DSD: @19 @12 [HomeI]
 [Get_Next_SX] - FantasyTime True

FIG. 30A-2

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Ending SxT(2):				Speed	Rads	Reason	Situation
RxName	X	Y	Decision				
StoryPAL	206	180	@19 @12 [HomeI]	21	2.22	MARV	NIL
lion	225	208	race to LowI	24	2.05	RF-SCAN	LowINear
tree	108	50	don't move	0	6.13	RF-SCAN	Anything
native	267	10	wander	10	4.70	RF-SCAN	Anything
rabbit	13	268	explore	10	5.01	RF-SCAN	Anything
rabbit	273	104	explore	10	6.27	RF-SCAN	Anything
deer	429	270	patrol	22	1.84	RF-SCAN	Anything
grass	29	326	don't move	0	0.67	RF-SCAN	Anything
grass	323	347	don't move	0	1.52	RF-SCAN	Anything
grass	335	86	don't move	0	0.00	RF-SCAN	Anything

[What_Now_Porpoise] : FantasyTime True
[Next_N_Subgoals_Reached] - FantasyTime True
SUB-P/SG NAME: safe @6 [HomeI]
No next(n) subgoal found.

[Predicting Strategy] Try: 3 of 25
Trial DSD: @19 @12 [HomeI]
[Get_Next_SX] - FantasyTime True

Ending SxT(3):				Speed	Rads	Reason	Situation
RxName	X	Y	Decision				
StoryPAL	193	163	@19 @12 [HomeI]	21	2.22	MARV	NIL
lion	211	188	race to LowI	24	2.17	RF-SCAN	LowINear
tree	108	50	don't move	0	6.13	RF-SCAN	Anything
native	266	19	wander	10	4.70	RF-SCAN	Anything
rabbit	16	258	explore	10	1.20	RF-SCAN	Anything
rabbit	265	96	explore	10	2.36	RF-SCAN	Anything
deer	423	248	patrol	22	1.84	RF-SCAN	Anything
grass	29	326	don't move	0	0.67	RF-SCAN	Anything
grass	323	347	don't move	0	1.52	RF-SCAN	Anything
grass	335	86	don't move	0	0.00	RF-SCAN	Anything

[What_Now_Porpoise] : FantasyTime True
[Next_N_Subgoals_Reached] - FantasyTime True
SUB-P/SG NAME: safe @6 [HomeI]

No next(n) subgoal found.

[Predicting Strategy] Try: 4 of 25
Trial DSD: @19 @12 [HomeI]
[Get_Next_SX] - FantasyTime True

Ending SxT(4):				Speed	Rads	Reason	Situation
RxName	X	Y	Decision				
StoryPAL	180	146	@19 @12 [HomeI]	21	2.22	MARV	NIL
lion	196	168	race to LowI	24	2.19	RF-SCAN	LowINear
tree	108	50	don't move	0	6.13	RF-SCAN	Anything
native	265	28	wander	10	4.70	RF-SCAN	Anything
rabbit	12	248	explore	10	1.96	RF-SCAN	Anything
rabbit	276	85	move from LowI	16	0.75	RF-SCAN	LowINear
deer	417	226	patrol	22	1.84	RF-SCAN	Anything
grass	29	326	don't move	0	0.67	RF-SCAN	Anything
grass	323	347	don't move	0	1.52	RF-SCAN	Anything
grass	335	86	don't move	0	0.00	RF-SCAN	Anything

[What_Now_Porpoise] : FantasyTime True
[Next_N_Subgoals_Reached] - FantasyTime True
SUB-P/SG NAME: safe @6 [HomeI]
No next(n) subgoal found.

[Predicting Strategy] Try: 5 of 25
Trial DSD: @19 @12 [HomeI]
[Get_Next_SX] - FantasyTime True

FIG. 30A-5

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[What_Now_Porpoise] : FantasyTime True
 [Next_N_Subgoals_Reached] - FantasyTime True
 SUB-P7SG NAME: safe @6 [HomeI]
 No next(n) subgoal found.

[Predicting Strategy] Try: 2 of 25
 Trial DSD: @19 @12 [HomeI]
 [Get_Next_SX] - FantasyTime True

Ending SxT(2):

RxName	X	Y	Decision	Speed	Rads	Reason	Situation
StoryPAL	198	159	@19 @12 [HomeI]	21	2.26	MARV	NIL
lion	217	185	race to LowI	24	2.09	RF-SCAN	LowINear
tree	108	50	don't move	0	6.13	RF-SCAN	Anything
native	266	19	wander	10	4.70	RF-SCAN	Anything
rabbit	19	259	explore	10	5.98	RF-SCAN	Anything
rabbit	272	94	explore	10	5.42	RF-SCAN	Anything
deer	423	257	patrol	19	1.84	RF-SCAN	Anything
grass	29	326	don't move	0	0.67	RF-SCAN	Anything
grass	323	347	don't move	0	1.52	RF-SCAN	Anything
grass	335	86	don't move	0	0.00	RF-SCAN	Anything

[What_Now_Porpoise] : FantasyTime True
 [Next_N_Subgoals_Reached] - FantasyTime True
 SUB-P7SG NAME: safe @6 [HomeI]
 No next(n) subgoal found.

[Predicting Strategy] Try: 3 of 25
 Trial DSD: @19 @12 [HomeI]
 [Get_Next_SX] - FantasyTime True

Ending SxT(3):

RxName	X	Y	Decision	Speed	Rads	Reason	Situation
StoryPAL	184	142	@19 @12 [HomeI]	21	2.26	MARV	NIL
lion	202	165	race to LowI	24	2.20	RF-SCAN	LowINear
tree	108	50	don't move	0	6.13	RF-SCAN	Anything
native	265	28	wander	10	4.70	RF-SCAN	Anything
rabbit	27	253	explore	10	0.60	RF-SCAN	Anything
rabbit	284	83	move from LowI	16	0.72	RF-SCAN	LowINear
deer	417	238	patrol	19	1.84	RF-SCAN	Anything
grass	29	326	don't move	0	0.67	RF-SCAN	Anything
grass	323	347	don't move	0	1.52	RF-SCAN	Anything
grass	335	86	don't move	0	0.00	RF-SCAN	Anything

[What_Now_Porpoise] : FantasyTime True

[Next_N_Subgoals_Reached] - FantasyTime True
 SUB-P7SG NAME: safe @6 [HomeI]
 No next(n) subgoal found.

[Predicting Strategy] Try: 4 of 25
 Trial DSD: @19 @12 [HomeI]
 [Get_Next_SX] - FantasyTime True

Ending SxT(4):

RxName	X	Y	Decision	Speed	Rads	Reason	Situation
StoryPAL	170	125	@19 @12 [HomeI]	21	2.26	MARV	NIL
lion	187	146	race to LowI	24	2.23	RF-SCAN	LowINear
tree	108	50	don't move	0	6.13	RF-SCAN	Anything
native	264	37	wander	10	4.70	RF-SCAN	Anything
rabbit	32	261	explore	10	5.25	RF-SCAN	Anything
rabbit	274	82	explore	10	3.09	RF-SCAN	Anything
deer	411	219	patrol	19	1.84	RF-SCAN	Anything
grass	29	326	don't move	0	0.67	RF-SCAN	Anything
grass	323	347	don't move	0	1.52	RF-SCAN	Anything
grass	335	86	don't move	0	0.00	RF-SCAN	Anything

[What_Now_Porpoise] : FantasyTime True
 [Next_N_Subgoals_Reached] - FantasyTime True
 SUB-P7SG NAME: safe @6 [HomeI]
 No next(n) subgoal found.

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FIG- 29

The Expert System Main Screen Menus

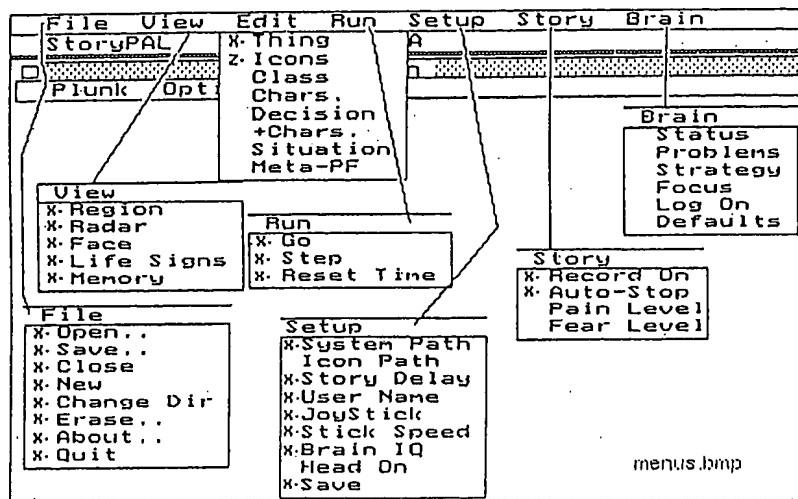
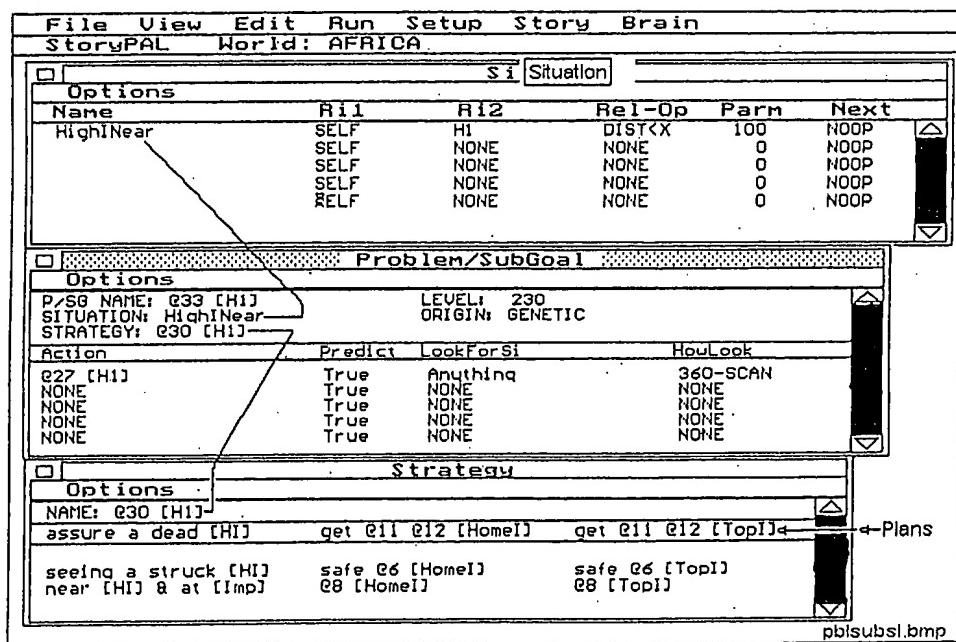


FIG- 31



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FIG. 32

SPACIO-TEMPORAL RELATIONSHIPS IN SOFTWARE EMBODIMENT

Relational Operator	Meaning
NONE	This is the last line. Don't read any further.
DIST>X	The distance between Pi1 (usually the self-object, Ris) and Pi2 is greater than X
DIST<X	The distance between Pi1 and Pi2 is less than X
FASTER	Pi1 is moving faster (more units of distance per Current Situation) than Pi2
SLOWER	Pi1 is moving slower (less units of distance per Current Situation) than Pi2
TOWARD2	Pi1 is moving toward Pi2 ("toward" = Radians in the Parm field. If the angle of movement is less than the Parm field's radians, Toward is True. Zero radians is East or to the Right on the screen)
TOWARD1	Pi2 is moving toward Pi1
AWAYFR2	Pi1 is moving away from Pi2 (parenthetical note on TOWARD2 applies here)
AWAYFR1	Pi2 is moving away from Pi1
>ANGX	The angle between Pi1 and Pi2 exceeds X (X is in radians)
<ANGX	The angle between Pi1 and Pi2 is less than X (X is in radians)
MOVE>X	Pi1 is moving faster than X
<LOCX	Pi1 is at a location whose screen X-coordinate is less than X
>LOCX	Pi1 is at a location whose screen X-coordinate is greater than X
<LOCY	Pi1 is at a location whose screen Y-coordinate is less than Y
>LOCY	Pi1 is at a location whose screen Y-coordinate is greater than Y
1CL2BYX	Pi1 is closer to Pi2 than X units of distance
1FR2CYX	Pi1 is farther from Pi2 than X units of distance
FEEL	The self Pi is feeling as per what is here set out